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SECTION 24

FLOOR AND WALL HOLES AND OPENINGS

24.A GENERAL

24.A.01 All floor and roof openings into which persons can accidentally walk or fall through shall be guarded by a physical barrier or covered.

24.A.02 All floor and roof holes through which equipment, materials, or debris can fall shall be covered.

24.A.03 Coverings for floor and roof openings shall be of sufficient strength to support any load which may be imposed and shall be secured in place to prevent accidental removal or displacement.

24.A.04 Conduits, trenches, and manhole covers and their supports, when exposed to vehicles or equipment, shall be designed to carry a truck rear axle load of 2 times the maximum anticipated load.

24.A.05 Wall openings, from which there is a drop of more than 1.2 m (4 ft) and the bottom of the opening is less than .9 m (3 ft) above the working surface, shall be guarded with a top rail or a top rail and intermediate rail or a standard guardrail. A toeboard or enclosing screen shall be provided where the bottom of the wall opening, regardless of width, is less than 10 cm (4 in) above the working surface.

24.A.06 Wall opening protection shall meet one of the following requirements:

- a. barriers of such construction and mounting that, when in place at the opening, the barrier is capable of withstanding a

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SECTION 25

EXCAVATIONS

25.A GENERAL

25.A.01 Planning.

a. Prior to opening an excavation, underground installations (e.g., sewer, telephone, water, fuel, electric lines) shall be located and protected from damage or displacement: utility companies and other responsible authorities shall be contacted to locate and mark the locations and, if they so desire, direct or assist with protecting the underground installations.

b. Where excavations are to be performed in areas known or suspected to be contaminated with explosives, unexploded munitions, or military ordnance, surface and subsurface clearance by qualified explosive ordnance disposal (EOD) personnel shall be accomplished prior to excavation work.

25.A.02 Excavation inspection and testing.

a. When persons will be in or around an excavation, the excavation, the adjacent areas, and protective systems shall be inspected daily, as needed throughout the work shifts, and after every rainstorm or other hazard-increasing occurrence by a competent person.

b. If evidence of a situation which could result in possible cave-ins, slides, failure of protective systems, hazardous atmospheres, or other hazardous condition is identified, exposed workers shall be removed from the hazard and all work in the excavation stopped until all necessary safety precautions have been implemented.

c. In locations where oxygen deficiency or gaseous

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load of at least 90 kg (200 lb) applied in any direction (except upward) with a minimum of deflection at any point on the top rail or corresponding member, or

b. screens of such construction and mounting that they are capable of withstanding a load of at least 90 kg (200 lb) applied horizontally at any point on the near side of the screen: they may be of solid construction, or grill work with openings not more than 20 cm (8 in) long, or of slat work with openings not more than 10 cm (4 in) wide with length unrestricted.

24.A.07 Every hatchway and chute floor opening shall be guarded by a hinged floor-opening cover. The opening shall be barricaded with railings so as to leave only one exposed side; the exposed side shall be provided either with a swinging gate or so offset that a person cannot walk into the opening.

24.A.08 An extension platform outside a wall opening onto which materials can be hoisted for handling shall have a standard railing that meets Section 21.B of this manual. However, one side of an extension platform may have removable railings to facilitate handling materials.

DEFINITIONS

Floor (roof) hole: a ground, floor, or roof opening measuring less than 30 cm (12 in) but more than 2.5 cm (1 in) in its least dimension.

Floor (roof) opening: a ground, floor, or roof opening measuring 30 cm (12 in) or more in its least dimension; includes skylights.

Wall hole: a wall opening less than 75 cm (30 in) but more than 2.5 cm (1 in) in height and of unrestricted width.

Wall opening: a wall opening at least 75 cm (30 in) high and 45 cm (18 in) wide.

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or if personnel are exposed to hazards from falling objects.

21.A.12 Nails shall be driven full length; double-headed nails shall not be used on decks, guardrails, or handrails.

21.A.13 Accessways shall be inspected daily and maintained in a safe manner.

a. Accessways shall be kept free of ice, snow, grease, mud, debris or any other material or equipment which could obstruct passage, cause a tripping hazard, or render them unsafe in any other way.

b. Where accessways are slippery, abrasive material shall be used to assure safe footing.

c. All obstructions or projections into an accessway shall be removed or conspicuously marked; obstructions or projections which are sharp, pointed, or which may cause lacerations, contusions, or abrasions shall be covered with protective material.

d. Accessways, including their accessories, which become damaged or weakened shall not be used until they are repaired or replaced.

21.A.14 When moving platforms to the next level, the old platform shall be left undisturbed until the new bearers have been set to receive the platform planks.

21.A.15 Fall protection.

a. Employees shall be protected by standard guardrail, catch platforms, temporary floors, safety nets, personal fall protection devices, or the equivalent, in the following situations:

(1) on accessways (excluding ladders) or work platforms from which they may fall 1.8 m (6 ft) or more.

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(nominal) or 5 cm x 22.5 cm (2 in x 9 in) (rough) solid sawn wood planks shall be as follows:

Maximum intended load, Pa	Maximum permissible span: full thickness undressed lumber, m	Maximum permissible span: nominal thickness lumber, m
1,200	3.0	2.4
2,400	2.4	1.8
3,600	1.8	n/a

The maximum permissible span for 3 cm x 22.5 cm (1 1/4 in x 9 in) or wider wood plank of full thickness with a maximum intended load of 50 psf shall be 1.2 m (4 ft).

b. Fabricated planks and platforms may be used in lieu of solid sawn wood planks. Maximum spans for such units shall be as recommended by the manufacturer based on the maximum intended load being calculated as specified in Table 21-1.

c. Planking shall be secured to prevent loosening, tipping, or displacement and supported or braced to prevent excessive spring or deflection; intermediate beams shall be provided to prevent dislodgement of planks due to deflection. > See 21.A.04

d. Planking shall be laid with edges close together across the entire access surface; there will be no spaces through which personnel, equipment, or material could fall.

e. When planking is lapped, each plank shall lap its supports at least 30 cm (12 in).

f. Where the ends of planks abut each other to form a flush floor, the butt joint shall be at the centerline of a pole and abutted ends shall rest on separate bearers.

21.A.11 Accessways shall have overhead protection equal to 5 cm (2 in) solid planking whenever work is performed over them

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- c. The employer shall verify employee training by a written certification record which identifies the employee trained, the dates of the training, and the signature of the trainer.

21.B STANDARD GUARDRAILS AND HANDRAILS

21.B.01 A standard guardrail shall consist of top rails, midrails, and posts, and shall have a vertical height of 105 cm +/- 7.5 cm (42 in +/- 3 in) from the upper surface of the top rail to the floor, platform, runway, or ramp level. Standard guardrail systems shall be provided with toeboards on all open sides/ends at locations where persons are required or permitted to pass or work under the elevated platform or where needed to prevent persons and material from falling from the elevated platform.

21.B.02 Guardrail systems shall be designed to meet the following requirements.

- a. capable of withstanding, without failure, a force of at least 90 kg (200 lbs) applied within 5 cm (2 in) of the top edge, in any outward or downward direction, at any point along the top edge.
 - b. when the force described in a. above, is applied in a downward direction, the top edge of the guardrail shall not deflect to a height less than 97.5 cm (39 in) above the walking/working level.
 - c. midrails, screens, mesh, intermediate vertical members, solid panels, and equivalent structural members shall be capable of withstanding, without failure, a force of at least 68 kg (150 lb) applied in any downward or outward direction at any point along the midrail or other member.
- 21.B.03 Dimensions of standard guardrail components. The following guidelines may be used in designing guardrail systems to satisfy the requirements specified in 21.B.02. The employer is still responsible for designing a complete system and assembling these components in accordance with 21.B.02.

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- (2) on accessways or work platforms over water, machinery, or dangerous operations,
(3) on runways from which they may fall 1.2 m (4 ft) or more.

b. Every stairway and ladder way floor opening shall be guarded on all exposed sides, except the entrance openings, by securely anchored standard guardrail; entrance openings shall be offset or provided with a gate to prevent anyone walking into the opening.

c. Platforms, except scaffolds, 1.2 m to 1.8 m (4 ft to 6 ft) in height, having a minimum horizontal dimension in either direction of less than 115 cm (45 in) shall have standard railing installed on all open sides and ends of the platform or the workers shall use personal fall protection.

21.A.16 Training.

a. Each employee who might be exposed to fall hazards shall be trained by a competent person qualified in the following areas, in the safe use of accessways and fall protection systems and the recognition of hazards related to their use, including:

- (1) the nature of access and fall hazards in the work area,
 - (2) the correct procedures for constructing, erecting, maintaining, using, and dismantling accessways and fall protection systems,
 - (3) the maximum intended load-carrying capacities of accessways and fall protection systems, and
 - (4) all applicable requirements from this section, and
 - (5) the limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs, the correct procedures for handling and storage of equipment and materials, and the erection of overhead protection.
- b. Retraining shall be provided as necessary for employees to maintain an understanding of these subjects.

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